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PCT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Craig M. Noah and John N. Gregg

Filed: Concurrently Herewith

For: SYSTEM FOR SUPPLY OF MULTIPLE CHEMICALS TO A PROCESS TOOL

Serial No.: Unknown

International Application No.: PCT/US99/14845

International Filing Date: June 30, 1999

Priority Date Claimed: June 30, 1998

Group Art Unit: Unknown

Examiner: Unknown

Atty Dkt: ADCS:013US

NUMBER: EL703719373US

I hereby certify that this paper or fee is being deposited with the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service, postage prepaid, under 37 CFR 1.10 on the date indicated above and is address to: Assistant Commissioner of Patents, Washington, D.C. 20231 on December 28, 2000.

*Roberto Ferrara*  
Signature

Assistant Commissioner for Patents  
Washington, DC 20231

Dear Sir:

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19<sup>th</sup> month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.

- c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 317(c)(2)).
7. ☒ Amendments to claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
- a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☐ have been transmitted by the International Bureau.
- c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
- d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) 35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 317(c)(5)).

Items 11 to 16 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
- ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:
17. ☐ The following fees are submitted:

## BASIC NATIONAL FEE (37 CFR 1.492(a) (1) – (5)):

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO..... \$ 970.00

International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO..... \$ 840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but International search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$ 760.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
but all claims did not satisfy provisions of PCT Article 33(10)-(4))..... \$ 670.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
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ENTER APPROPRIATE BASIC FEE AMOUNT =

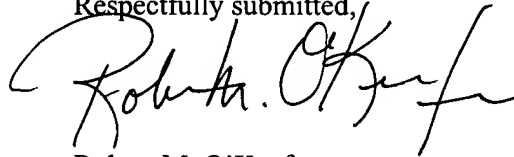
**\$840.00****FEE CALCULATION:**

CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	Total Claims (37 CFR 1.16(e))	<u>24</u> - 20 =	4	x \$ 18.00	\$ 72.00
	Independent Claims (37 CFR 1.16(b))	<u>3</u> - 3 =	0	x \$ 80.00	\$ 0
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))			x \$ 260.00	\$
				Basic Fee (from above)	\$ 840.00
				Total of above Calculations =	\$ 912.00
	Reduction by 50% for filing by Small Entity (Note: 37 CFR 1.9, 1.27, 1.28)				\$ 0
	Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 29 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				
	Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				
	<b>TOTAL NATIONAL FEE =</b>				<b>\$ 912.00</b>
	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40.00 per property.				\$
	<b>TOTAL FEES =</b>				<b>\$ 912.00</b>

- a. ☐ A check in the amount of \_\_\_\_\_ to cover the above fees is enclosed.
- b. ☐ If the check is inadvertently omitted, or should any additional fees under 37 CFR §1.16 to 1.21 be required for any reason relating to the enclosed materials, or should an overpayment be included herein, the Commissioner is authorized to deduct or credit said fees from or to Deposit Account No. 10-1205.

Please forward all correspondence to the undersigned at the address below.

Respectfully submitted,



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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Craig M. Noah et al.

Serial No.: PCT/US99/14845

Filed: June 30, 1999

Entitled: SYSTEM FOR SUPPLY OF MULTIPLE CHEMICALS TO A PROCESS TOOL

Atty. Dkt: ADCS:013PCT

NUMBER: EJ655337615US

I hereby certify that this paper or fee is being deposited with the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service, postage prepaid, under 37 CFR 1.10 on the date indicated below and is address to: Assistant Commissioner of Patents, Box PCT, Washington, D.C.

Alfredo Ferrara  
Signature

8-26-99  
Date

## RESPONSE TO INVITATION TO CORRECT DEFECTS

Assistant Commissioner of Patents  
Box PCT  
Washington, D.C. 20231

EPO - DG 1

23.12.1999

(80)

Dear Sirs:

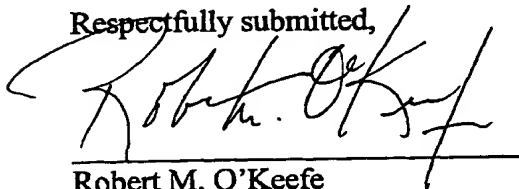
In response to the Invitation dated 28 July 1999, enclosed are (a) replacement drawings that conform to PCT requirements, and (b) an Appointment of Agent signed by each applicant.

Also enclosed are replacement sheets 15/1, 16/1, and 17/1 which are submitted to correct minor errors in the specification. On page 15, lines 3 and 4, "supply (process)" and "refill" have been switched so that the text corresponds to FIG. 10 and the balance of the specification. On page 16, line 11, one "60B" was deleted as it was redundant, "50B" was deleted since it is not shown in FIG. 12, and "80B" and "30B" were added, which are shown in the drawing. On page 17, line 29, "1422a" and "1422b" were changed to "1421a" and "1421b", respectively, to bring the text into alignment with the drawing. The corrections of these minor errors does not constitute new matter.

Should any fees be required for any reason relating to the enclosed materials, please deduct said fees from O'Keefe, Egan & Peterman Deposit Account No. 10-1205.

Please date stamp and return the enclosed postcard to acknowledge receipt of these materials.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert M. O'Keefe", written over a horizontal line.

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form part of an overall manifold. In FIG. 10, three overall manifolds are employed, one manifold for each set of canisters. In FIG. 10, several details as depicted in FIG. 1 have been omitted for simplicity. In general it is seen that the cabinet includes refill manifolds 2B, 3B, and 4B; supply (process) manifolds 2C, 3C, and 4C which include four branch manifolds 162B, 163B, and 164B. FIG. 11 illustrates a three-dimensional representative view of certain components of the manifold 2A that could be mounted within a cabinet 310. As can be seen in FIG. 11, components of refill manifold 2B and supply manifold 2C are shown, including four branch supply manifold 162B, such as may be employed in FIG. 10.

FIGS. 12 and 12a depict additional manifold and canister configurations for delivery of a plurality of chemicals to a process tool. FIGS. 12 and 12a are similar to FIG. 1, but are different in certain ways. The system 1 in FIGS. 12 and 12a includes valves and lines which have been numbered to correspond with those of FIG. 1, to the extent there is overlap. In FIG. 12 there is shown another representative, non-limiting example of a system configuration of this invention. FIG. 12 shows a system 1 that in general provides for refill and delivery of three chemicals.

The system configuration in FIG. 12 employs three essentially identical manifolds 2A, 3A, and 4A. By increasing head pressure in supply canister 110B, liquid chemical may be forced out through line 121B, CI 101B, four branch supply valve 160A to four branch supply manifold 162B from which chemical is distributed to one or more process tools. Output lines may be connected to any of the four exit ports of the four branch supply manifold 162B, with such output lines leading to a canister, a valve manifold box containing another four branch supply manifold, or a process tool. Chemical may be dispensed from supply canisters 110D and 110F by a similar procedure. Chemical may be delivered to a process tool by use of a pump that withdraws chemical from the supply canisters rather than pushing, mechanical pressure, via a pneumatic cylinder, or via a bag of chemical in a canister that has pressure applied to it, or via a bag in the canister which supplies the pressure as by filling the bag with gas or liquid. In FIG. 12, vacuum can be provided via line 37A, which ties in above valve 17A, through open valve 17A to the four branch manifold 162B while the four branch manifold continues to provide chemical. Vacuum may also be provided to the valving

attached to canister 110B by opening valve 60B in 2C. It should be appreciated that the branched supply manifold 162B uses four branch valves, a supply manifold may use any number of valves. For instance, the branched supply manifold may employ two or more branch valves. Although there is no limit as to the number of branch valves in the branched supply manifold, typically the number of valves is 10 or less. It should be noted that the branched supply manifold is connected to and in communication with the process line. In FIG. 12, control valve 80B is connected to canister outlet 101B rather than inlet valve 100B as shown in FIG. 1. It may be appreciated that in FIG. 12 the valve configuration in 2C is substantially similar to the valve configuration in 2B, which is in contrast to the configuration shown in FIG. 1. Thus, in FIG. 12 while 2B employs valves 60A, 70A, 40A, 30A and 50A, 2C similarly employs valves 60B, 80B, 70B, 40B, and 30B. In FIGS. 1, 12 and 12A, each of the process canisters (110B, 110D and 110F) has an outlet valve to which a dip tube is connected, an inlet valve through which chemical is provided to the process canister, and a third valve which serves to provide positive pressure or vacuum to the canister. The configuration of FIG. 12a is substantially similarly to FIG. 12 except that distribution manifolds 162B have been removed. This is particularly applicable to systems that supply small quantities of chemicals during a fabrication process, or if only a single tool is being fed chemicals. In both FIG. 12 and FIG. 12a, the system provides a source of silicon, phosphorous and boron.

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FIG 13 depicts one embodiment of a manifold used in the practice of this invention. This configuration is used in FIG. 12 and FIG. 12a. Thus, in FIG. 13, the manifold amounts to sections of 2B and 2C, for example, wherein the left side that connects to a refill canister includes valves 30A, 40A, 50A, 60A and 70A, and wherein the right side, which connects to a process canister, includes valves 30B, 40B, 50B, 60B and 70B. Each respective side also includes regulators 32A, 32B which serve to meter inert gas into the system and pressure transducers 75A and 75B which serve to monitor pressure.

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FIGS. 14, 14a, 14b, 14c, 14d, 14e and 14f depict various exterior, interior, and cutaway views of a cabinet used in the practice of this invention. FIG. 14 shows a representative top for a cabinet of this invention. The top 1401 has dimensions appropriate to

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